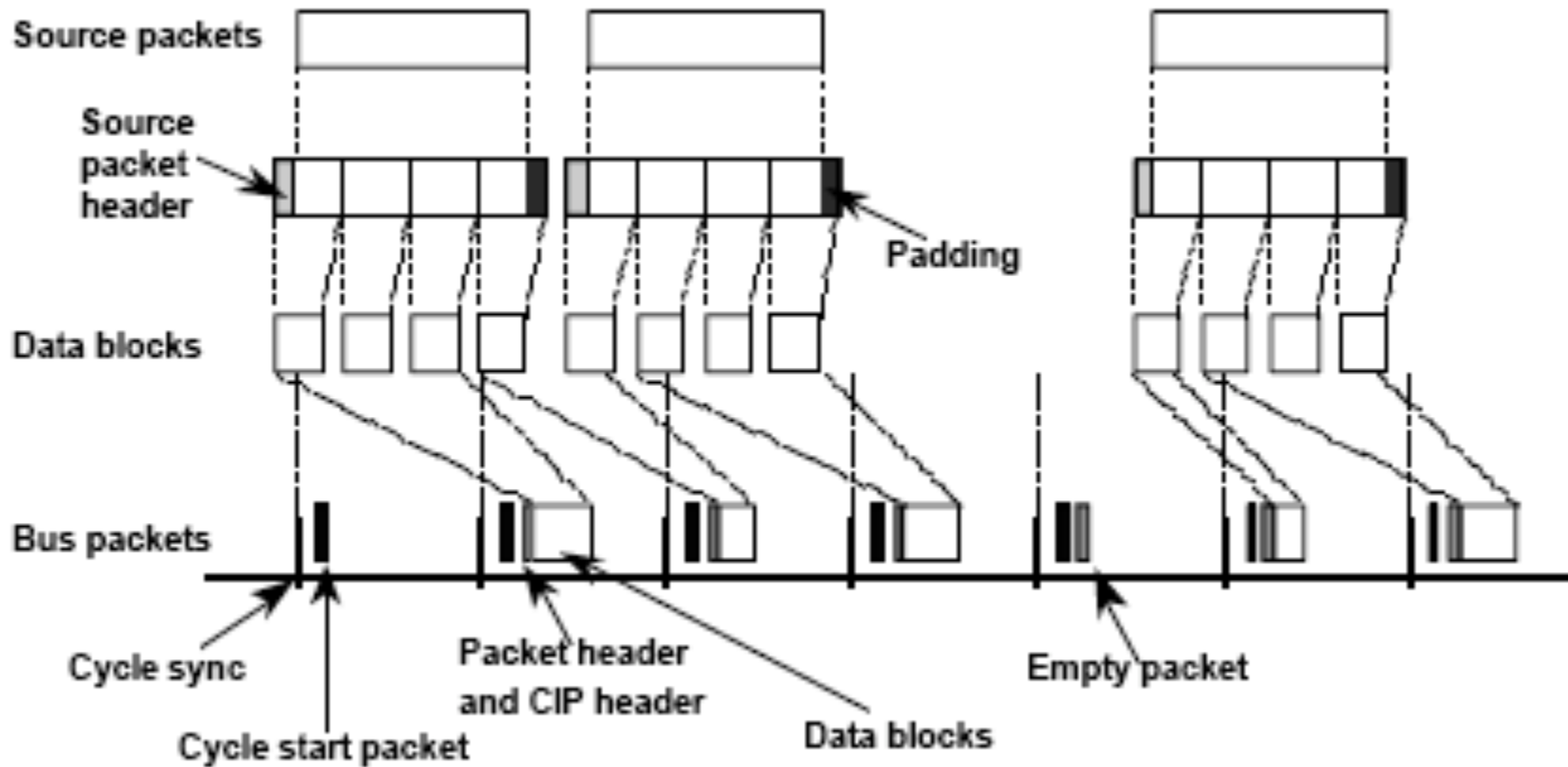

Higher Level Streaming Standards: Part 1 - IEC 61883

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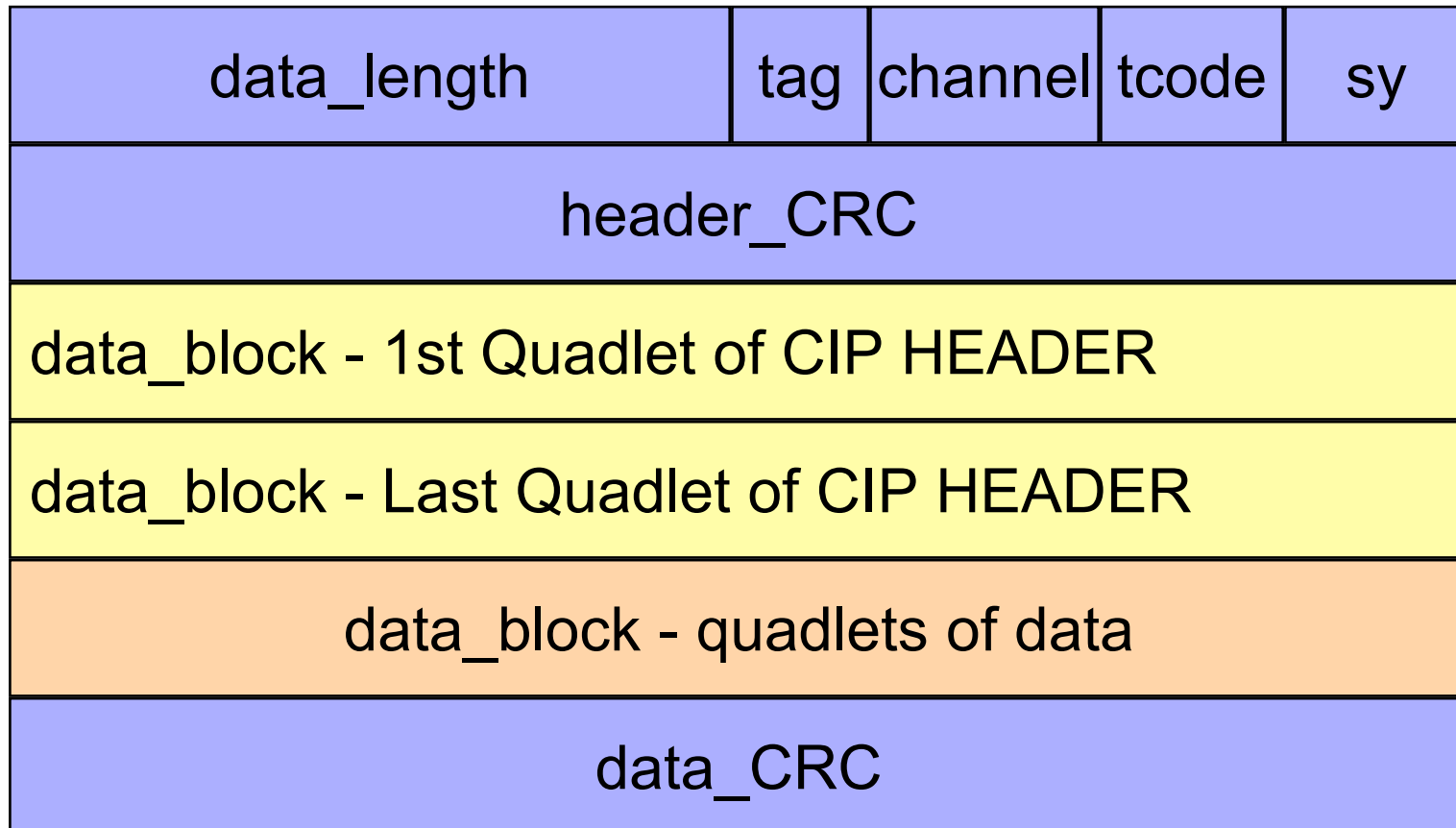
IEC 61883 Standards

- IEC 61883 - Digital Interface for Consumer Audio/video Equipment
 - Part 1: General
 - Part 2: SD-DVCR data transmission
 - Part 3: HD-DVCR data transmission (unused)
 - Part 4: MPEG-2-TS data transmission
 - 1394 TA adding MPEG-4 and MP3
 - Part 5: SDL-DVCR data transmission (unused)
 - Part 6: Audio and Music data transmission
 - Part 7: Transmission of Rec. ITU-R BO.1294 System B Transport 1.0 (DSS - almost MPEG-2)

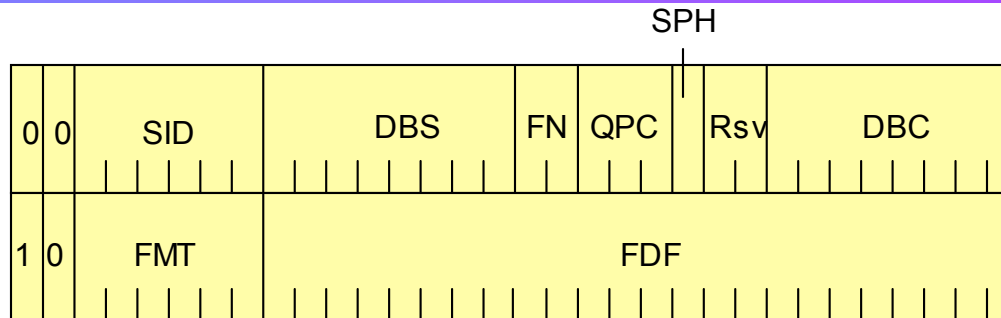
Transmission Model



IEC 61883-1: Common Isochronous Packet (CIP)

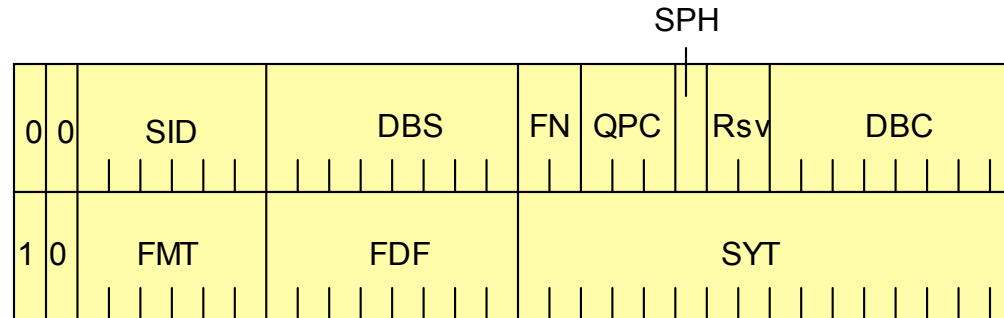


Two Quadlet CIP Header



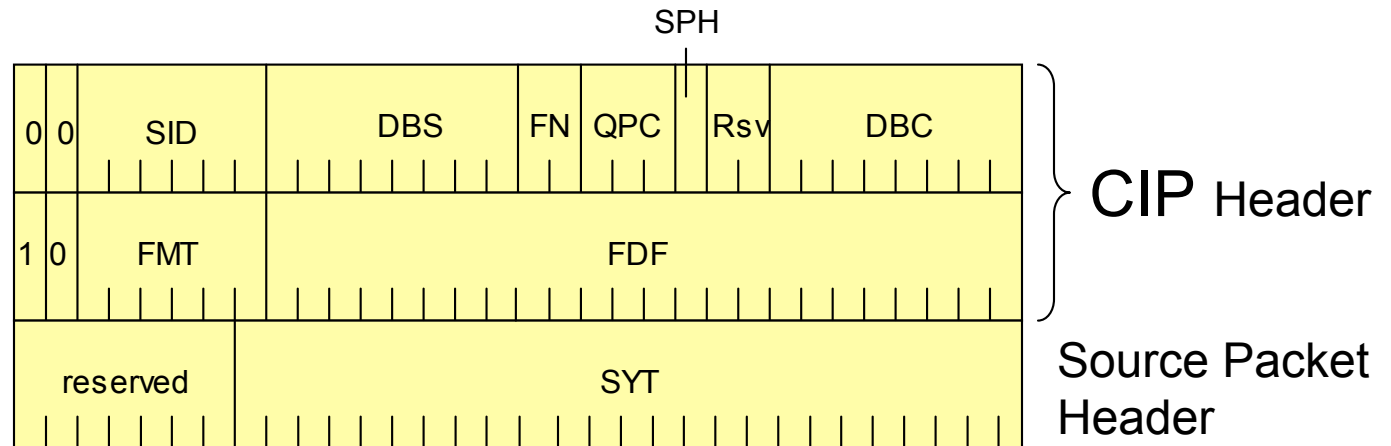
- SID: Source node ID (node ID of transmitter)
- DBS: Data block size in quadlets (max 256)
- FN: Fraction number. The number of data blocks into which a source packet is divided: 1,2,4, or 8
- QPC: The number of dummy quadlets padded at the end of the source packet to ensure each data block is of equal size
- Rsv: reserved
- SPH: Indicates that this CIP packet contains a source packet header
- DBC: Data block count. Indicates both the number of the data block within the source packet and the number of source packets (modulo 256)
- FMT: Format ID. Indicates the type of CIP information contained in the packet
- FDF: Format dependent field: Defined for each FMT

CIP Header With SYT Field



- CIP Fields identical to two-quadlet CIP header
- SYT: 16-bit time stamp

CIP Header With Source Packet Header



- CIP Fields identical to Two Quadlet CIP Header
- Source Packet Header (SPH) has 25-bit time stamp (SYT)

Source Packets

- A source packet is the original media data structure from an application
 - Example: MPEG2-Transport Stream (part 4)
 - Packet length 192 bytes:
 - 4 header bytes
 - 188 data bytes
- IEC 61883 assumes source packets have a fixed length
- There is usually an event time associated with the arrival of the first bit of a source packet

Data Blocks

- Source packets may be broken into 1,2,4, or 8 data blocks for transmission over IEEE 1394
 - Dummy quadlets may be padded into the last data block of each source packet so that all data blocks are equal size
 - Each isochronous cycle of IEEE 1394 transmits zero or more data blocks
 - If no data blocks are ready for transmit, an “empty packet” is sent
 - The receiver collects the data blocks and recombines them into a source packet

Time Stamps

- For IEC 61883 parts 2, 3, and 5 (“DVCR”) a time stamp is transmitted once each video frame period
- For part 4 (MPEG2-TS) the time stamp represents the intended delivery time of the first bit/byte of the transport stream to the transport stream decoder
- For part 6 (Audio and Music) the time stamp represents the delivery time of the first audio or data bit to the application (codec, decoder, transmitter, etc.)

IEC 61883-2: SD-DVCR

- Standard Definition - Digital Video Cassette Recorder (“DV”, “MiniDV”)
- CIP Header with SYT
- 480 byte source packet size
 - 6 DIF blocks per packet.
- Data Block Size = 1 source packet
- Each isochronous cycle contains either 1 data block or an empty packet
- SYT is used to synchronize
 - included on first packet in video frame

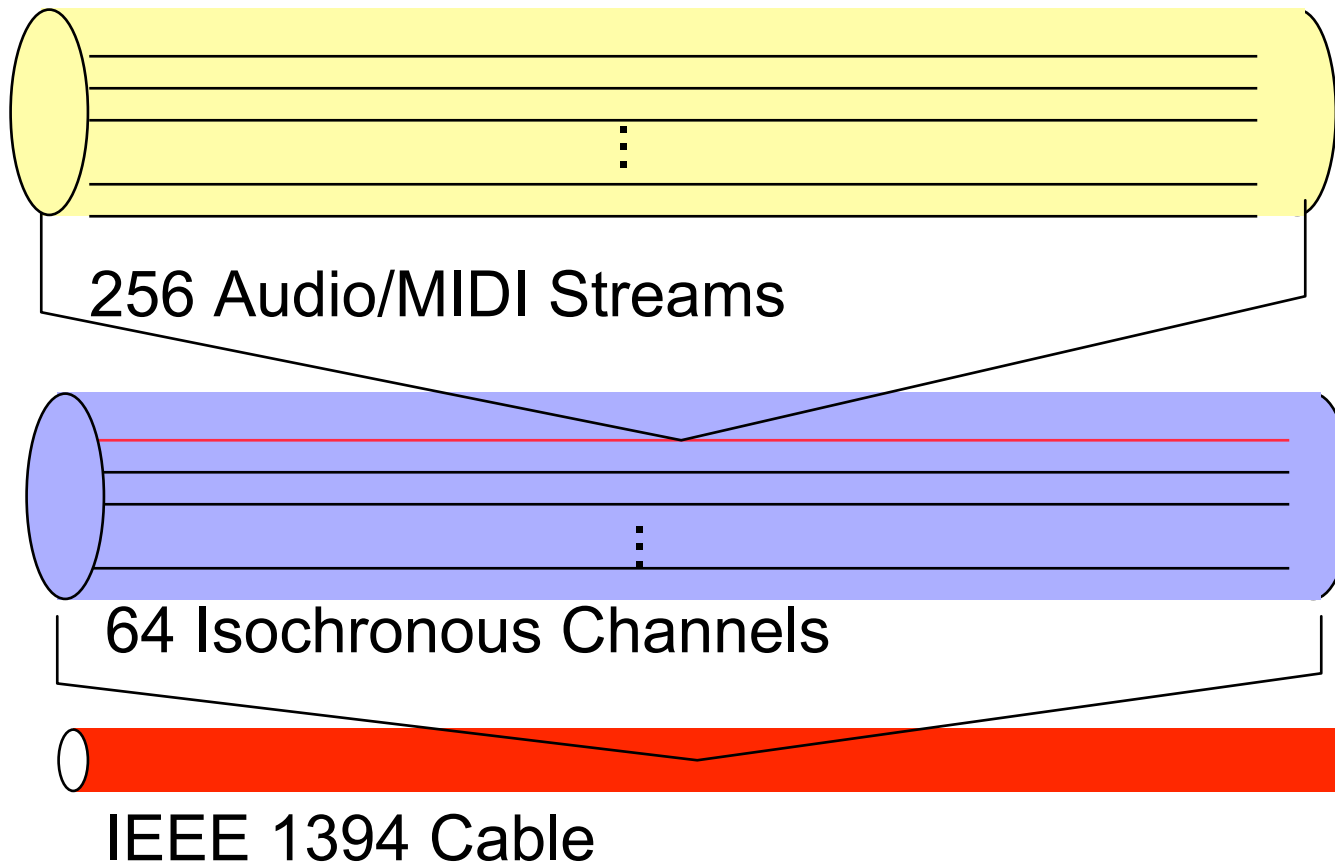
IEC 61883-4: MPEG2-TS

- MPEG-2 - Transport Stream
- Two-quadlet CIP Header with Source Packet Header
- ETS 300 468
- 192 bytes per source packet (4 header and 188 data)
- Source packet is split into 8 data blocks of 6 quadlets each
- Each isoc cycle contains either 1 data block or an empty packet
- SYT indicates the delivery time of the first bit/byte of the transport stream packet
- Receiver buffer size of 3264 bytes is given by Annex A for jitter compensation

IEC 61883-6: Audio and Music Data

- Originally published by Yamaha as “mLAN” specification
- Uses CIP Header with SYT
- Audio formats: Linear PCM, IEC958
- Music Data formats: MIDI
- *Blocking and non-blocking* methods

IEC61883-6: Channelization

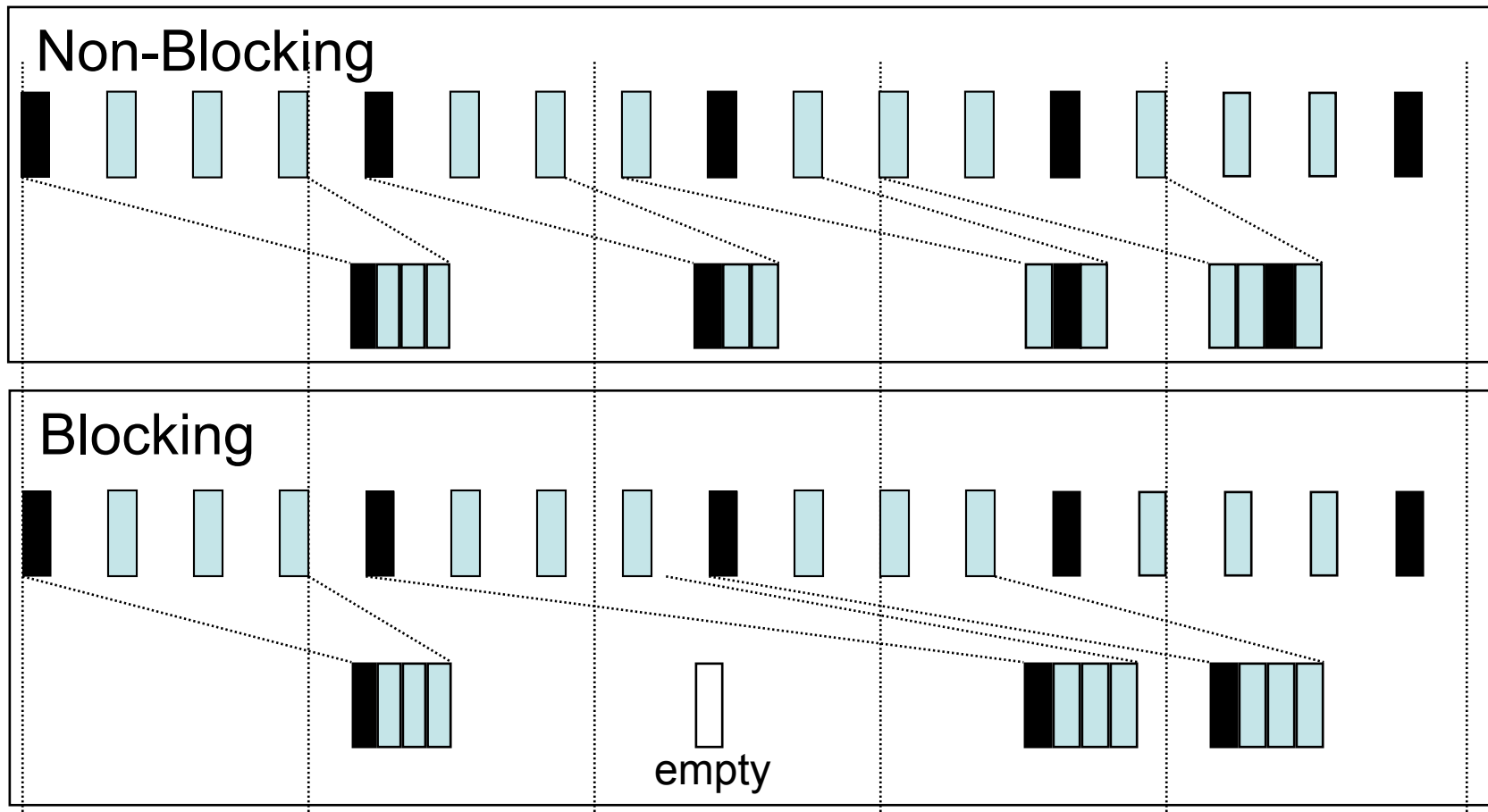


Blocking and Non-Blocking

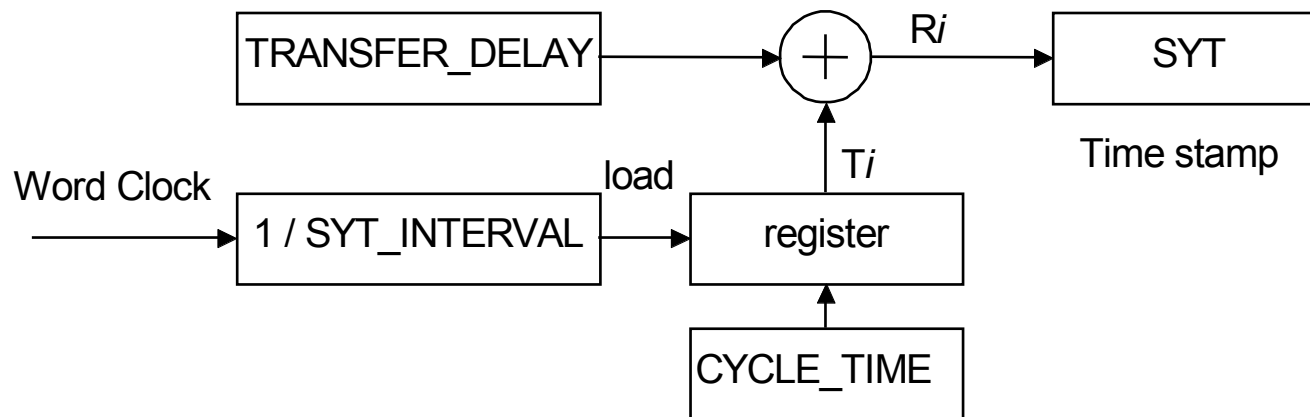
- Refers to two conditions by which a non-empty CIP is ready to be transmitted
 - **Blocking**: non-empty CIP packets are only transmitted after receipt of a fixed number of events (samples)
 - **Non-blocking**: non-empty CIP packets are transmitted each isoch cycle containing any events (samples) that have arrived since the last isoch cycle

Blocking and Non-Blocking (examples)

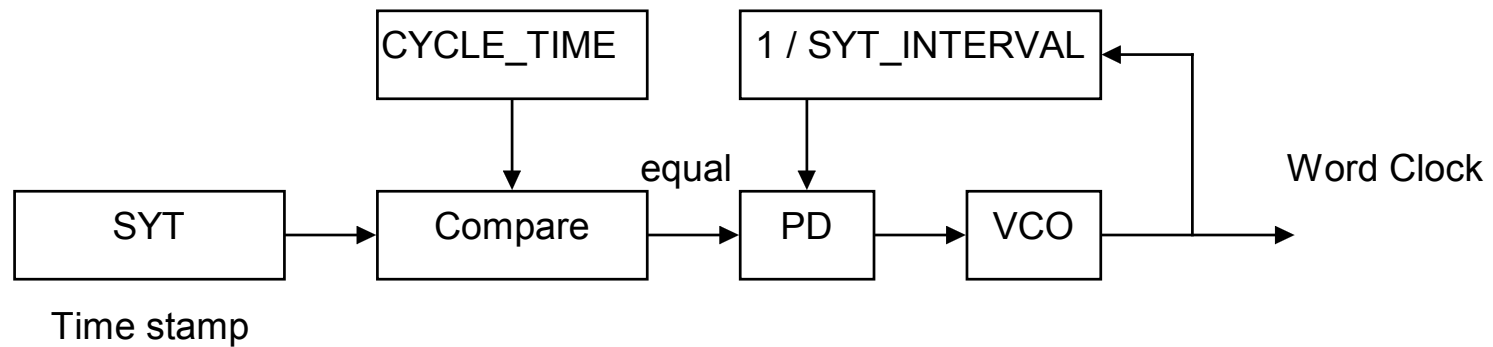
(time stamp each 4th data block: SYT_INTERVAL = 4)



IEC 61883-6: Time Stamp Generation



IEC 61883-6: Clock Recovery



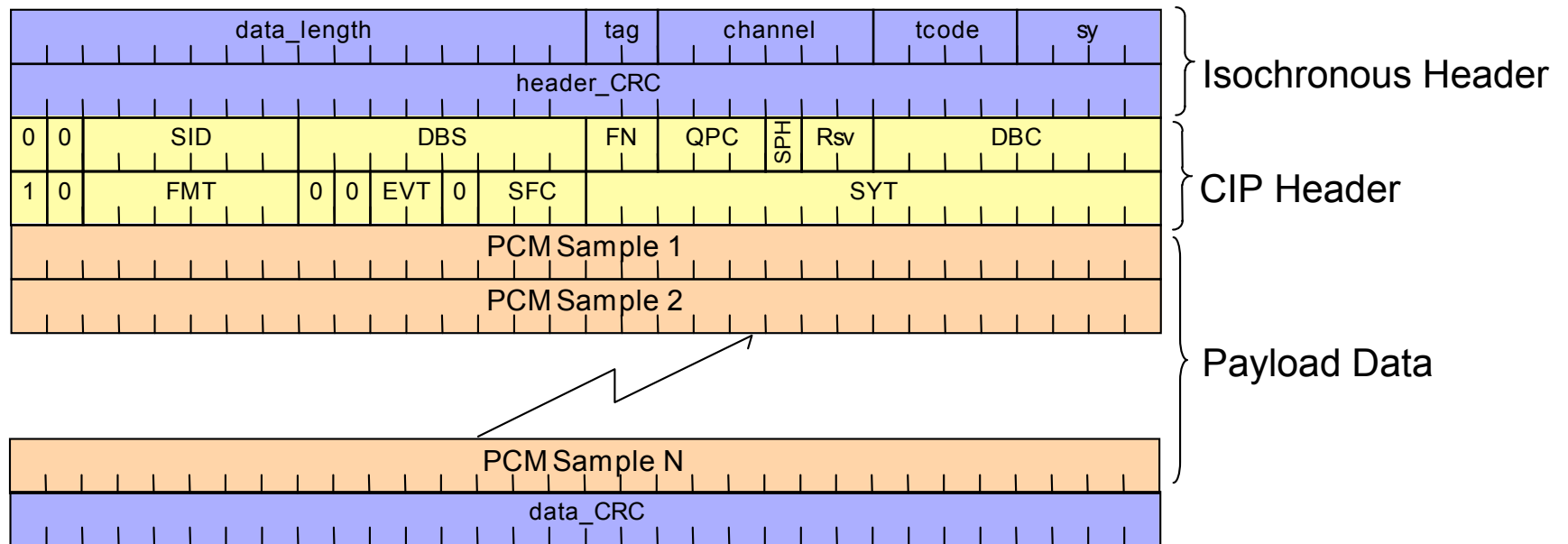
IEC 61883-6: AM824 Payload Data Format



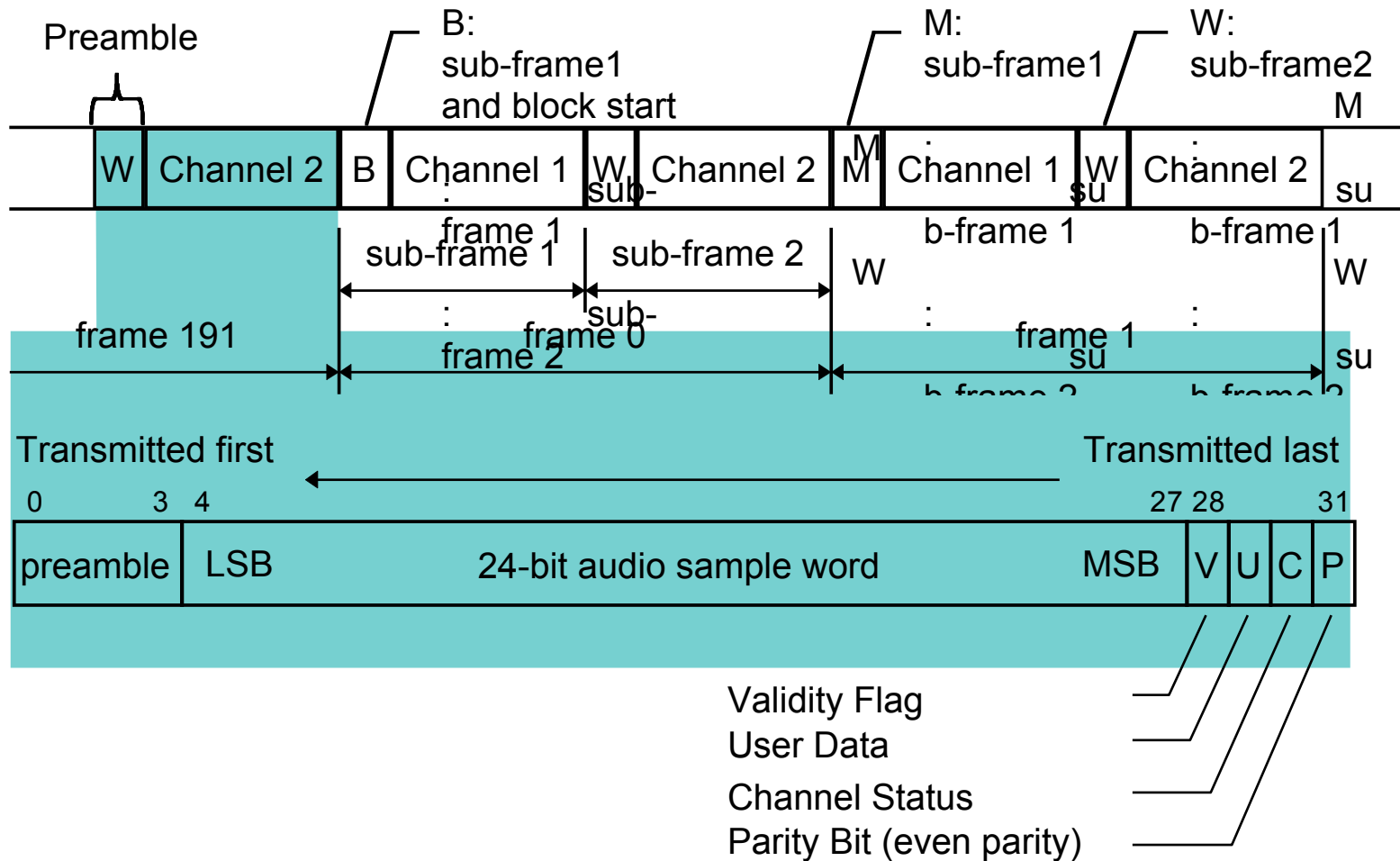
LABEL Definition

Value(Hex)	Description
00-3f	IEC958 Conformable
40-43	Raw Audio
44-7f	- Reserved -
80-83	MIDI Conformable
84-ff	- Reserved -

IEC 61883-6: CIP Containing Linear PCM



IEC 60958 Format



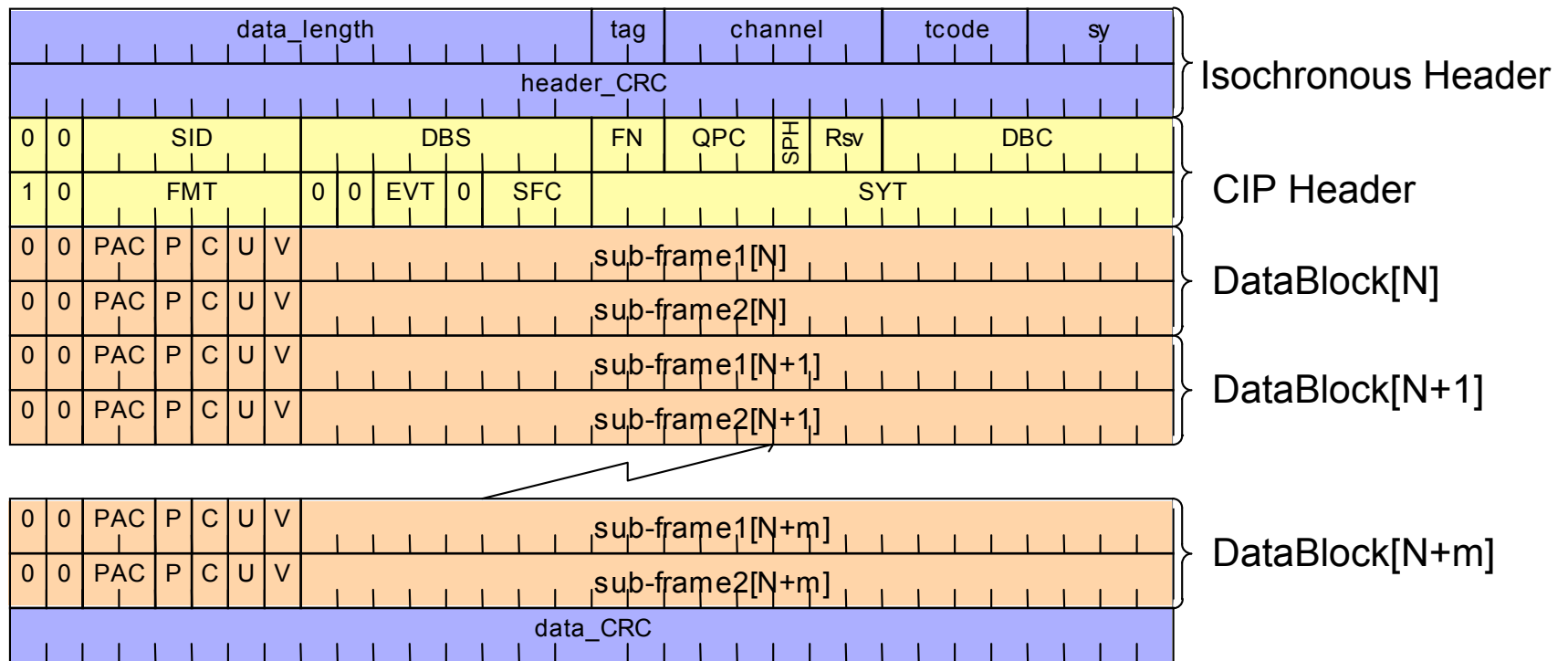
IEC 61883-6: One IEC 60958 Sub-Frame



PAC (Preamble code) Definition

Value(Bin)	Description
11	'B'
01	'M'
00	'W'

IEC 61883-6: IEC 60958 CIP



IEC61883-6: Compound Data Packet

- Payload of IEC 61883-6 CIP may contain a variety of AM824 data blocks, e.g.: Linear PCM, IEC60958
- Sample rates must be identical
- 1394 Trade Association “Enhancements” document defines other implementation guidelines

Thank you!